the director has endeavoured to recover specimens of these instruments and also the register of observations. Unfortunately, he has found no records and none of the original vases. But he has unearthed three copies of the pluviometer. The illustration reproduced here (Fig. 1) shows the instrument with the pedestal on which it stood. This instrument dates back to 1770. The three large Chinese characters declare that it is an instrument to measure rain, and the seven smaller give the date of its construction, in Chinese reckoning. Several pillars have been found without pluviometers attached, and one is particularly interesting, as a long Chinese inscription is engraved upon it, and though some of the characters have been obliterated by time, enough remains to connect it with the original order of King Sejo.

This same king erected astronomical observatories and fitted them with excellent instruments for the time. He seems to have prided himself on the possession of an automatic clepsydra, in which the hours and quarters were sounded by manikins. The general form of clepsydra seems to have consisted of four vessels at different levels, "and water poured in the highest vessel flows, passing through the intermediate ones, into the lowest, where an arrow with graduations to indicate the time in its upper part, was floated." Fig. 2 gives the general form of the instrument, but the mechanism is not well shown. Dr. Wada also reproduces a photograph of an ancient observatory, demonstrating the forward state of science of the age, about 647 A.D. It is supposed to have been used for the making of observations to correct the calendar, but there is nothing in the picture to suggest that it ever formed part of an observatory. It is simply a tower-like structure.

THE ADMISSION OF WOMEN TO THE FRENCH ACADEMIES.

WE learn from the *Times* of January 5 that at the recent quarterly plenary meeting of the five academies of the French Institute, the question of the eligibility of women candidates for the institute came up for consideration. It arose from the circumstance that Mme. Curie, the discoverer of radium, has been put forward as a candidate for one of the vacant seats in the Academy of Sciences. How her claims are regarded by that body may be inferred from the fact that in the list as finally submitted her name stands at the head. It is stated that at the general meeting more than 150 academicians were present, and that the proceedings, as might have been expected, "were extremely animated." Eventually the motion in favour of the admission of women was rejected by 90 votes to 52. The institute further adopted a motion to the effect that whilst it did not presume to dictate to the separate academies, there was, in its opinion, "an immutable tradition against the election of women, which it seemed eminently wise to respect."

It remains to be seen what the Academy of Sciences will do in face of such an expression of opinion. Mme. Curie is deservedly popular in French scientific circles. It is everywhere recognised that her work is of transcendent merit, and that it has contributed enormously to the prestige of France as a home of experimental inquiry. Indeed, it is not too much to say that the discovery and isolation of the radio-active elements are among the most striking and most fruitful results of a field of investigation pre-eminently French. If any prophet is to have honour in his own country—even if the country be only the land of his adoption—surely that honour ought to belong to Mme. Curie. At the moment, Mme. Curie is without a doubt, in the eyes of the world, the dominant figure in French chemistry. There is no question that any man who had contributed to the sum of human knowledge what she has made known, would, years ago, have gained that recognition at the hands of his colleagues which Mme. Curie's friends are now desirous of securing for her. It is incomprehensible therefore, on any ethical principles of right and justice, that because she happens to be a woman she should be denied the laurels which her pre-eminent scientific achievement has earned for her.

There may be room for difference of opinion as to the wisdom or expediency of permitting women to embark on the troubled seas of politics, or of allowing them a determinate voice in the settlement of questions which may affect the existence or the destiny of a nation; but surely there ought to be no question that in the peaceful walks of art, literature, and science there should be the freest possible scope extended to them, and that, as human beings, every avenue to distinction and success should unreservedly be open to them.

All academies tend to be conservative and to move slowly; they are the homes of privilege and of vested interest. Some of them even incline to be reactionary. They were created by men for men, and for the most part at a time when women played little or no part in those occupations which such societies were intended to foster and develop. But the times have changed. Women have gradually won for themselves their rightful position as human beings. We have now to recognise that academies as seats of learning were made for humanity, and that, as members of the human race, women have the right to look upon them as their heritage and property no less than men. This consummation may not at once be reached, but as it is based upon reason and justice it is certain to be attained eventually.

NOTES.

AN earthquake of unusual violence occurred in Russian Turkestan at 1.25 a.m. on January 4, or shortly after 11 p.m. on January 3 (Greenwich mean time). At Vyernyi, the chief town of the district, with more than 11,000 inhabitants, the shock lasted for nearly five minutes, and has been succeeded by a large number of after-shocks. Nearly every building in the town is damaged, and all the mud-houses in the neighbourhood have collapsed. The total loss of life is unknown, but forty bodies have so far been recovered from the ruins. It is reported that the whole of the town of Prjevalsk, which is situated on the shores of lake Issik Kul, has been destroyed by the waters of the lake. The extraordinary violence of the earthquake is attested by its effects on the seismographs of distant observatories. At Pulkova, more than 2200 miles from the epicentre, practically all the instruments were thrown out of order. This was the case even in this country. At West Bromwich, the first tremors were recorded at 11.35 p.m., and soon attained a range of 15 mm. By 11.54 the range was far beyond the capacity of the instrument, and at midnight the east-west needle collapsed. The great movement continued until 12.12 a.m., and the disturbance did not end until 3.56 a.m., giving a total duration of 4¼ hours. At Cardiff the maximum movement was registered at 12.14 a.m., and was so great that the instrument was deranged. At Limerick all the instruments were dismounted. The earthquake, which is one of the greatest of the last quarter of a century, is evidently a successor of that which occurred on June 9, 1887, when Vyernyi suffered even greater injury than on the recent occasion, owing to the prevalence of stone buildings, which have since been largely replaced by wooden ones.

WE regret to see the announcement of the death, on January 10, of Mr. J. W. Tutt, whose work in entomology and other departments of natural history are known to many men of science. Mr. Tutt was trained as an elementary-school teacher at St. Mark's College, Chelsea, and was at the time of his death headmaster of the Portman Place Higher Grade School. He became a Fellow of the Entomological Society of London in 1885, and was a member of its council. He was also prominently associated with other entomological and natural history societies in the City and South London, and was honorary member of La Société Entomologique de Namur and La Société Entomologique de Geneve. He was editor of the *Entomologist's Record* as well as of the *South-Eastern Naturalist*, and the author of numerous papers and other publications of substantial scientific value, including "A Natural History of British Lepidoptera," "A Natural History of British Butterflies," "A Natural History of British Alucitides," "Migration and Dispersion of Insects," "Melanism and Melanochroism in British Lepidoptera," "British Noctuæ and their Varieties," "Monograph of the British Pterophorina." Mr. Tutt also wrote a number of works on the more popular aspects of natural history, and in many ways contributed to the advancement and extension of scientific knowledge.

WE record with regret the death, on January 6, of Sir John Aird, at the age of seventy-seven years. Sir John Aird's name will be associated by most people with the erection of the Assuan dam and the Assiut barrage. With his partners he was the builder of the Manchester Ship Canal. He was also actively engaged in many other great engineering undertakings, which include, among others, waterworks at Amsterdam, Calcutta, Copenhagen, London, and Birmingham; the docks at Tilbury, Southampton, Avonmouth, and Singapore; the West Highland Railway and the Hull and Barnsley Railway; and gas plants on a large scale in many parts of the world. Sir John Aird was elected an associate of the Institution of Civil Engineers in 1859, and a member of the Iron and Steel Institute in 1887. He was created a baronet in 1901.

THE French Prehistoric Congress is to be held at Nîmes on August 13–20 of this year.

THE French Society of Therapeutics has awarded its gold medal to M. Ch. Moureu, for his work on the rare gases and the radio-activity of French mineral waters.

MR. F. M. BAILEY, Colonial Botanist, Queensland, and Mr. G. H. Knibbs, Commonwealth Statistician, Commonwealth of Australia, were included among the new C.M.G.'s in the list of New Year Honours. We regret their names were omitted from our note last week.

BY the generosity of Dr. Charcot, the *Pourquoi Pas?* has become the property of the French Department of Public Instruction. The vessel is anchored off Rouen, and is attached to the Paris National Museum of Natural History. An annual grant of 10,000 francs, we learn from the *Revue scientifique*, has been made towards the upkeep of the ship, which will be utilised by the museum for oceanographical cruises.

THE Christiania correspondent of the *Morning Post* states that more than a hundred distinguished Norwegians, including the Prime Minister, the Ministers for Foreign Affairs, Public Works, and Commerce, and the Rector of the University, gave a banquet on January 7 in honour of Dr. S. Eyde, the well-known engineer, who has done so much towards the development in Norway of the industry based upon the fixation of atmospheric nitrogen.

WE learn from the *Chemist and Druggist* that the late Dr. Ernest Durand, known as the donor to the Paris Museum of Natural History of the herbarium originally belonging to the botanist Cosson, has left the sum of 6000*l.* to be devoted to the classification and study of the botanical collections in the museum. At the time these collections were given to the authorities, in 1906, Dr. Durand gave 2000*l.* to defray the expense of classification, &c.

A MEETING of the International Association of Seismology will be held in Manchester under the presidency of Prof. Arthur Schuster, F.R.S., beginning on Tuesday, July 18 next. The meeting will consist of delegates of the twenty-three countries belonging to the association, and other men of science who may be invited by the president. The president asks us to state that he will be glad to hear from anyone interested in the subject.

AT a meeting on January 4, the Development Commissioners considered their policy in connection with agricultural instruction in England and Wales and in regard to the financial needs of the Scottish agricultural colleges, and decided upon the terms of a letter to the Scottish authorities. The Commissioners also decided to obtain, temporarily, scientific assistance for the investigation of the possibilities of the cultivation of tobacco and flax.

THE arrival of several boxes of skins of mammals and other animals from Sze-chuen at the natural history branch of the British Museum affords the *Times*, in its issue of January 3, an opportunity of referring to the generosity of the Duke of Bedford in providing funds for collecting expeditions in northern China and other districts in the heart of Asia, these museum expeditions having been carried on for several years. Reference is also made to similar work which has been carried on for some time in Africa at the expense of Mr. C. D. Rudd. The latest of these expeditions is now at work in British East Africa.

ON Tuesday next, January 17, Prof. F. W. Mott, F.R.S., will begin a course of six lectures at the Royal Institution on "Heredity," and on Thursday, January 19, the Astronomer Royal, Mr. F. W. Dyson, F.R.S., will deliver the first of three lectures on "Recent Progress in Astronomy." The Friday evening discourse on January 20 will be delivered by Sir James Dewar, F.R.S., on "Chemical and Physical Change at Low Temperatures"; On January 27 by Prof. W. H. Bragg, F.R.S., on "Radio-activity as a Kinetic Theory of a Fourth State of Matter"; and on February 3 by Dr. A. E. Shipley, F.R.S., on "Grouse Disease."

THE council of the Rhodesia Scientific Association adopted the following resolution at a meeting held recently:—"That a gold medal be offered for an original paper advancing our knowledge of the transmission of any insect- or arachnid-borne disease affecting Rhodesia, such paper to be read at a meeting of the Rhodesia Scientific Association for publication in its Proceedings. The medal will only be awarded for a paper which, in the opinion of the council, is of sufficient scientific merit." Non-residents as well as residents in Rhodesia are invited to send in papers not later than July 31 addressed to D. Niven, Secretary Rhodesia Scientific Association, P.O. Box 586, Bulawayo.

THE council of the Institute of Metals reports that a large increase has recently taken place in the membership of the institute, which now reaches more than 550. Additional honorary members have been appointed in the persons of Dr. R. T. Glazebrook, F.R.S., and Sir Andrew Noble, Bart., K.C.B., whilst Sir William H. White, K.C.B., F.R.S., has been elected the first fellow of the institute. The annual general meeting of the institute will be held on January 17–18. On the latter day, papers will be read at the Institution of Mechanical Engineers, Westminster, S.W., commencing at 10.30 a.m. Among the papers are the following:—A new critical point in copper-zinc alloys: its interpretation and influence on their properties, Prof. H. C. H. Carpenter; some practical experience with corrosion of metals, Engineer Rear-Admiral J. T. Corner, C.B.; the adhesion of electro-deposited silver in relation to the nature of the German silver basis metal, Prof. A. McWilliam and Mr. W. R. Barclay. There will also be presented the preliminary report to the Corrosion Committee, by Mr. G. D. Bengough. This report will be of an important character, dealing with the present state of our knowledge of the corrosion of non-ferrous metals and alloys, with suggestions for a research into the causes of the corrosion of brass condenser tubes by sea water. Full particulars regarding the institute can be obtained from Mr. G. Shaw Scott, secretary of the Institute of Metals, Caxton House, Westminster, S.W.

The first annual meeting of the Astronomical Society of Barcelona was held on December 8, 1910, when the new president and executive council were elected. Addresses were delivered by the retiring president on the progress of astronomical science during the year 1910, and by the secretary on the development of the society since its foundation. The inaugural meeting of the society was held on January 30, 1910, at the University of Barcelona, as a result of the labours of Don Salvador Raurich, who had been carrying out valuable educational work in the city by means of popular articles on astronomical and allied subjects contributed to the columns of *Las Noticias*, a well-known Barcelona journal. At the inaugural meeting Dr. Esteban Terradas, professor of physics in the University of Barcelona, was elected first president, and a strong executive council was formed. In April King Alphonso became a life member, and was elected honorary president. At the present time the membership numbers 230, and as a result of the first year's work the society finds itself with a bank balance of 80*l.* after paying all expenses. In the future it is intended to devote the accumulated funds of the society to the erection and equipment of an observatory, where members may meet regularly in a social way for practical observation and the informal discussion of questions of astronomical interest. During the year lectures on astronomical subjects were delivered in the Grand Saloon of the University of Barcelona, and numerous addresses on a smaller scale were given on practical spectroscopy and general astronomy in the private observatories of certain members. The following is a list of the officers of the society for the year 1911:—*President,* Prof. Eduardo Fontseré, chief of the Time Service of Barcelona; *vice-presidents,* Prof. Luis Canalda and Don Ferdinand Tallada; *secretary,* Don Salvador Raurich; *vice-secretary,* Don A. Pulvé; *treasurer,* Prof. M. Font y Torné; *other members of the council,* Prof. Ignacio Tarazona, professor of astronomy in the University of Valencia; Dr. Enrique Calvet, Don José Subiranas, and Don Juan Mercadal. The address of the secretary is Diagonal, 462, Barcelona, where all communications should be addressed. The society is entering upon its second year of activity with bright prospects, and is very successfully cultivating a taste for astronomical study among all classes in Spain.

The Research Defence Society has just published a small book called "The Truth about Vivisection." The book is a collection of leaflets dealing with some of the main points in the practice of experiments on animals, and of the results obtained by this means. It also includes a leaflet on the charges made against the Rockefeller Institute, and also the correspondence between the secretary of the Church Anti-vivisection Society and the Bishop of North Queensland. All the points dealt with are clearly explained, and technical details are avoided so far as possible. The book is therefore suitable for anyone to read, even if not conversant with the correct phraseology. This is a great advantage, because the details of the whole matter are naturally of a highly technical character. Much of the misapprehension which exists in the minds of many people, including those who are definitely anti-vivisectionists, arises from want of knowledge. In the great majority of cases this is not wilful, but simply because the details have hitherto been almost impossible for the uninitiated to follow. There are, however, a few persons to whom the words of Mr. Rudyard Kipling are applicable. He says that there will always be persons "who consider their own undisciplined emotions more important than the world's most bitter agonies—the people who would limit and cripple and hamper research because they fear that research may be accompanied by a little pain and suffering." It is very desirable that all thinking people should endeavour to acquaint themselves with the essential facts of the case, and the recent publications of the Research Defence Society have now made this possible by providing the necessary information in a simple form. The leaflets show that 95 per cent. of the experiments performed are of inoculations, which are not really in any way an operation, being merely needle-pricks. A great number of these are routine investigations carried out on behalf of various Government departments for the preservation and improvement of the public health. The history of the successful fight against Malta fever and other tropical diseases forms a chapter of intense interest in the history of the British Empire, and is one which well repays study; this side of the question might with advantage be somewhat further developed in the collection of pamphlets in question. The little book is highly to be recommended, and should supply a great want.

In a report contributed to the December (1910) issue of *Man* on the Ceylonese drum known as *udakiya*, Dr. A. Willey connects this hour-glass pattern of instrument with certain drums made from human skulls found in Tibet. In the latter type the drum consists of two human *calvaria* inverted and superposed, the ends being covered with pieces of skin. The use of such drums for magical purposes is not uncommon in Tibet, and thence the shape may have passed to India, where it is still used by ascetics and spirit mediums, and thence to Ceylon. The custom which still prevails in Tibet of drinking from the skull of a holy man or an enemy is remotely connected with this form of drum.

In the December (1910) issue of *Man* Messrs. E. T. Nicholle and J. Sinel describe the exploration of a Palæolithic cave-dwelling, known as La Cotte, at St. Brelade, Jersey. The existence of this habitation has been known since 1881, and it has now been investigated under great difficulties, due to its position. Bones of *Rhinoceros tichorhinus*, horse, reindeer, and deer, with human teeth and some fragmentary bones, have been unearthed. The flint implements, found in considerable numbers, belong to the well-known tongue-shaped Mousterien class, the "pointe a main" of Mortillet. Falls of rubble have now rendered it impossible to make further examination of this site at present.

In the Johns Hopkins Hospital Bulletin for December, 1910, there is an instructive article by Dr. Lewellys F. Barker on electrocardiography and phonocardiography, and containing many illustrations of the apparatus employed and of the cardiograms obtained. It is chiefly remarkable for the description of the electrocardiographic installation in the medical clinic of the Johns Hopkins Hospital, which shows that the apparatus may be fitted up at a smaller cost than is generally supposed, and that it may be applied to the diagnosis of a good many cardiac and nervous diseases. The remarkable progress in this department of clinical inquiry is well shown in this paper, and especially in the analysis of the many curious cardiograms obtained at Baltimore and elsewhere.

In the Proceedings of the Royal Society, ser. B, vol. lxxxiii., p. 124, Dr. R. Kirkpatrick describes, under the name of *Murrayona phanolepis*, a new type of sponge from Christmas Island, Indian Ocean, referable to the family commonly known as the Pharetronidæ, equivalent to the Pharetrones of Zittel. When this group was first established, it was believed to be extinct, with its latest representative in the Mæstricht Chalk, but, inclusive of the new Christmas Island form, which constitutes a subfamily by itself, six living genera, each with a single species, are now known. Murrayona differs from all the other genera in that the skeleton consists of a firm basal network devoid of spicules, overlain by a dermal layer of scales, the axial core of spicules found in the other living genera having been discarded. The absence of spicules in some of the fossil Pharetrones may be due to the same cause, although in other instances (as has hitherto been considered to be the case with all) it may be the result of fossilisation. Apparently there is no such genus as Phareton, and if this be the case the family requires a new name.

The two articles in the *Journal of Economic Biology* for December, 1910, are devoted to "warbles." In the first of these Prof. G. H. Carpenter furnishes notes on the life-history of the reindeer warble-fly (*Œdemagena tarandi*), his specimens being derived from a young reindeer in the Dublin Zoological Gardens. He finds that the egg of Œdemagena has a thin flap at the free end, along the edge of which the egg-case readily splits. The position and appearance of this recall the "lid" of the egg of the horse bot (*Gastrophilus equi*), and suggest that the maggots of Œdemagena are licked off and swallowed by the reindeer immediately after hatching. In *Hypoderma bovis*, the ox warble, the egg has no such lid, which lends support to the suggestion that the host swallows the eggs instead of the maggots. In the second article Messrs. Cooper and Nuttall, who accept the idea that cattle lick off the eggs of Hypoderma from their legs as a definite fact, discuss means of preventing the destruction of hides by warbles. A hide was cut into four quarters, of which three were severally treated with different chemicals, including picric acid, and it was found that in none of the cases was tanning interfered with. It is recommended that the experiment of treating the legs of oxen with picric acid should be tried.

The current number of the *Quarterly Journal of Microscopical Science* (December, 1910) contains an elaborate and very interesting memoir, by Prof. J. P. Hill, on the early development of the Marsupialia, with special reference to the native cat (*Dasyurus viverrinus*). This forms the fourth of the author's well-known contributions to the embryology of the marsupials, and in it he describes in detail the process of cleavage, the formation of the blastocyst, and the differentiation of the embryonal ectoderm and endoderm. The uterine ovum possesses a shell-membrane and a layer of albumen outside the zona, analogous with the corresponding structures in the egg of monotremes, but is much smaller than the latter, and contains much less yolk, its condition in these respects being intermediate between that of the monotreme and that of the eutherian egg. The character of its early development is also intermediate between that of the two latter groups. Cleavage is complete, and at first meridional, resulting in the formation of a ring of eight blastomeres placed equatorially within the egg-shell, followed by an equatorial cleavage which divides each blastomere into two, an upper, smaller, and clearer, and a lower, larger, and more opaque. Two rings, each of eight cells, are thus formed, the upper one giving rise to the embryonal region of the blastocyst wall, and the lower to the extra-embryonal region, which the author regards as homologous with the trophoblast of the eutherian ovum. Prior to the completion of the first cleavage, the egg eliminates from itself a spherical mass of yolk which takes no direct part in development, though it becomes enclosed in the blastocyst cavity. The paper includes a valuable discussion of the early ontogeny of the Mammalia, in which the author defends the generally accepted view that the mammals are descended from ancestors which had large, heavily yolked eggs, and vigorously opposes the recently promulgated theory of Hubrecht, in accordance with which the alecithal character of the eggs of higher mammals represents the primitive condition. He also entirely disagrees with Hubrecht's interpretation of the trophoblast as an embryonic membrane comparable with that of the nemertines and other invertebrates. The "entypic" condition of the eutherian embryo is explained as a secondary modification due to the loss of the egg-shell.

A note by Miss A. G. Stokey on the sporangium of *Lycopodium pithyoides*, published in the *Botanical Gazette* (September, 1910), indicates that the sporangium arises from the leaf, but during development grows away from it, and appears to be cauline. In size and shape, as well as in the proportion of wall cells, the sporangium resembles that of *L. dichotomum*.

The annual report, for 1910, of the Department of Agriculture, Trinidad, by Prof. P. Carmody, covers the reports of the botanical departments in Trinidad and Tobago, of various estates, and the Government laboratories. The cacao exports for the year were the highest on record; crops of sugar-cane were good, but the sucrose content of the juice proved to be small. Analyses of Castilloa rubber trees of different ages showed that the latex in young trees contained more than 50 per cent. of resin, and this decreases to about 8 per cent. after eight or ten years.

A cytological investigation of corn rust, *Puccinia graminis*, described by Dr. F. Zach in the *Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften*, Vienna (April, 1910), deals with the crucial stage when the fungus invades the palisade cells of the leaf and enters upon a contest with the protoplasm and nucleus. Sometimes the fungus is worsted and its hyphæ are dissolved; in other cases the fungus is victorious, when the protoplasm and nucleus are disintegrated and certain portions are excreted. It is suggested that the power of the host to withstand the attack of the parasite is partly innate, but to a great extent determined by climatic and soil conditions. The author criticises the mycoplasm theory of Eriksson, which refers mainly to the phenomena here described.

A CATALOGUE of hybrid plants raised at Kew during past years is published in the *Kew Bulletin* (No. 9). The three hybrid species of Cytisus are interesting, two being ascribed to chance pollination by insects, while the third, *Cytisus Dallimorei*, producing pale purple flowers, was the result of an artificial cross between a variety of *C. scoparius* and *C. albus*; it received an award at the Temple Show last year. Success has been attained with several Rhododendron hybrids, notably a cross from *Rhododendron Fortunei*, and two monophyllous Streptocarpus hybrids are recorded. A Strelitzia that flowered for the first time during the winter 1909–10 was raised from a cross made in 1893.

THE Agricultural and Forestry Department of the Nyasaland Protectorate has issued its second annual report, from which we learn that the past year has been one of the most successful on record. A few years ago the only industry of any importance was coffee; when this failed, the plantations were closed down. With the introduction of cotton, tobacco, and rubber, the area of land under cultivation has steadily increased, and at no time in the history of the protectorate have such large areas of virgin land been opened up for planting as at present. The experimental work of the department consists in the improvement of existing crops and testing of new crops likely to be of value. Afforestation is also being undertaken, the railway and tobacco industries having been responsible for a large consumption of the native timber.

THE *Agricultural Journal of India*, vol. v., part iii., contains articles on the cultivation of millet, jute, Caravonica cotton, and bananas. The millet, *Andropogon Sorghum*, is grown in the dry zone of Upper Burma, where the yearly rainfall is from 20 to 25 inches, and rice will not grow. The grain furnishes food for the natives, and the leaves and stalks for cattle. Jute is grown on land suitable for rice; in some districts it is possible to take winter rice after jute, and thus to get two crops in one year; but this is not always possible, and in general it may be said that the area under jute represents the loss of so much land to rice. Caravonica cotton is a hybrid tree cotton recently introduced, for which many excellent properties were claimed. It is stated, however, that the variety has not been a success, and, further, that no tree cotton is known that will answer as a field crop.

THE need for phosphatic manures in all parts of the world, and the rate at which their already high consumption is increasing, makes it important that all known phosphate deposits should be mapped as thoroughly as possible. Should a phosphate famine ever occur, it would be more serious than a coal or any other famine, as no substitute of any kind is known. The United States Department of Agriculture Bureau of Soils has recently investigated the phosphate fields of Idaho, Utah, and Wyoming, and published the results as Bulletin 69 of their series. The deposits are considerable, and though they are not yet extensively worked because of their distance from markets, there is no doubt that they will become important in future. It is recommended that steps should be taken now to control the mining rights and to prevent waste of the lower-grade deposits that will not at first be profitable to work.

PROF. EMILE CHAIX, Avenue du Mail, 23, Geneva, has issued a circular letter, accompanied by a pamphlet, directing the attention of geographers and geologists to the "Atlas photographique des formes du Relief terrestre." This work was organised by the ninth International Congress of Geography in 1908, in accordance with a proposal by Profs. Brunhes and Chaix, and subscriptions are now asked for, so that a series of views may be prepared and published. Prof. Chaix's pamphlet furnishes the details, and it will be possible to subscribe for 100 plates at half a franc apiece, or single plates at one franc each. It is estimated that the whole series required would be about 500 to 600 plates, their issue being spread over ten years. The samples furnished give a picture about 13 cm. by 9 cm., and are of a geological rather than a geographical character. The scheme, however, is a wide one, and we may hope to see such subjects as typical cirques, alluvial plains, and escarpments, illustrated from all parts of the world. It is at present, for example, difficult to obtain views of our own Cotteswold Hills, or the meanders of the Severn, or the Hercynian ridges of southern Ireland. The cooperation of scientific photographers is invited, and it is to be hoped that geographical considerations will prevail in the selection.

IN the meteorological chart of the North Atlantic Ocean for January (first issue), published by the Meteorological Committee, attention is directed to the displacement of the high-pressure system to the region of Madeira and North Africa as one of the marked features in the daily weather maps of December 8–14, 1910, embracing the North Atlantic and adjacent shores. An enormous region of low pressure, extending from Nova Scotia to the western half of Europe, is shown by the charts; on the morning of December 12 the barometer reading on board the *Mauretania*, in lat. 51° N., long. 21° W., was as low as 28·04 inches. A remarkable circumstance connected with several well-developed secondary disturbances which advanced in rapid succession towards Ireland was that none of their centres passed eastward of the Irish Sea. Under their influence, the weather conditions were of an exceedingly unsettled type all through the week.

THE flexure of a rectangular plate under uniform hydrostatic pressure is a problem which mathematicians have from time to time attacked by different methods. A new investigation, based on the methods of Mr. Walter Ritz, is now published by Mr. D. Pistriakoff, of the Kieff Polytechnic. It is published in Russian, with a short abstract in French.

THOSE mathematicians and physicists who experience difficulty in forming a clear mental picture of the concepts of non-Euclidian geometry will find a useful and suggestive paper on the Bolyai-Lobatschewsky system, by Prof. H. S. Carslaw, in the Proceedings of the Edinburgh Mathematical Society, xxviii. (1910). The author starts by showing how the properties of planes and straight lines in ordinary space can be extended by inversion to spheres and circles through a fixed point. He then proceeds to consider the properties of spheres and circles that are orthogonal to a given fixed sphere, and shows that if these be called "ideal planes" and ideal lines, they will be found to possess properties exactly analogous to those of hyperbolic geometry. In the plane geometry thus established "ideal parallels" are represented by circles which touch on the fixed orthogonal circle, and thus it follows that through a given ideal point two parallels can be drawn to a given line. In short, Prof. Carslaw shows that a geometry identical with that of Bolyai and Lobatschewsky can be built up in ordinary Euclidian space, and, so far as plane geometry is concerned, in an ordinary

Euclidian plane. Unless some unforeseen fallacy in this investigation should be discovered which has escaped Prof. Carslaw's notice, we have here a convincing proof that Euclid's parallel postulate is incapable of demonstration. In fact, it is argued that if any inconsistency existed in the Bolyai-Lobatschewsky postulate this inconsistency would be extended by Prof. Carslaw's "ideal" system to Euclidian geometry. Do not these arguments point to the view that Euclid's postulate should be regarded as a property of matter rather than of space?

IN the *American Architect* for November 23 Mr. Wm. H. Goodyear describes measurements of 1910, undertaken on behalf of the Brooklyn Museum, of the spiral stairway of the Leaning Tower of Pisa. The main result of these measurements is to confirm the author's view that the inclination of the tower was intentional, and was not due to subsidence after or even during construction. The main evidence on this point is derived from an examination of the steps between the thirteenth and sixty-ninth. Not only does the mean height of the ceiling increase by 1 foot 10½ inches between the thirty-fifth and forty-ninth steps, but there is an increase in the downward dip of the ceiling to the inner wall of about 8½ inches in the whole interval. As the stairs in question represent the extremities of the line of greatest slope, the effect of these changes is to throw the weight of the structure off the overhanging side. On the higher floors these variations appear to have been abandoned, presumably on the ground that the safety of the structure was sufficiently secured without them, whereas if the inclination were accidental it is obvious that the tendency would be to increase the precautions as the subsidence increased. The author further points out the advantages from an æsthetic point of view of the standing of the Leaning Tower in a depression or "well," and also of the change of inclination of the upper storeys, both of which support the theory of intentional inclination of the structure.

THE measurements of the magnetic properties of iron, steel, nickel, and cobalt at the temperature of liquid air, which have been made by Dr. R. Beattie and Mr. H. Gerrard, and were described in the *Electrician* for December 23, 1910, confirm the view generally held on the strength of results obtained at higher temperatures, viz. that decrease of temperature increases hysteresis. The curves given for the hysteresis losses as functions of the magnetic induction in alternating and in rotating fields are of the same general form at the temperature of liquid air as at ordinary temperatures. The loss in cobalt in a rotating field is about twenty times that in nickel. The authors make no reference to the Langevin-Weiss theories, but, so far as one can judge from the curves, their results do not furnish any material support for those theories.

VOL. iii. of the Journal of the Municipal School of Technology, Manchester, consists of nearly four hundred pages of reprints of papers communicated by the staff and students to scientific societies and to the technical Press during the year 1909. The principal papers deal with mechanical and electrical engineering and with chemistry, and show that in these subjects, at least, the Manchester School stands in a position which no other technical school or polytechnic in the country has approached. Of the thirty papers, two may be selected as typical of the work the school is doing. The first, by Prof. Nicholson, deals with experiments directed to the removal of the obscurity which enveloped the subject of the transmission of heat from the furnace gases to the water in a steam boiler, and some of the results obtained have already been incorporated in boiler design. The second, by Prof. Knecht and Mr. J. P. Batey, contains the results of examinations of a number of dye-stuffs in solution in order to settle the question whether these substances exist in solution as colloids or not. The authors conclude that the dyes tested do not. These examples serve to show how successfully the Manchester School of Technology is bringing the power of science to bear on the industries of which Manchester is the centre.

AN interesting article on photo-elasticity, by Prof. E. G. Coker, appears in *Engineering* for January 6. Account is given of apparatus and experimental results obtained at Finsbury Technical College, the experiments having for their object the determination of the condition of stress in transparent bodies by the effect which these latter, when subjected to such stresses, produce on polarised light passed through them. A special optical bench designed by Mr. F. Cheshire is used, in which a lantern, fitted with an arc lamp, projects a beam of parallel light. The beam is polarised by a Nicol's prism, then passed through the specimen, which latter is stressed by some convenient apparatus. A lens focuses the beam on a second Nicol's prism, which serves as an analyser, and the image of the specimen so formed is thrown on a screen or sensitive plate. A feature of the article is the reproduction in colours, by the three-colour process, of a large number of photographs taken on Lumiere plates direct from the specimens under stress. These are of special interest to engineers, and include examples of beams, tension members, a furnace flue, circular hooks and chain links, a locomotive plate spring, a square threaded screw and nut, and a pillar. Examples are included showing the disturbance in the stress distribution caused by notching the specimens in various ways, and also the effect of a non-axial load on a tension member. Probably glass is the material possessing properties most closely resembling materials in general use by engineers, but, owing to the difficulty of preparing glass specimens, xylonite has been used.

MRS. H. PERIAM HAWKINS sends us a copy of a new (the fourth) edition of "The Stars from Year to Year," in which the account of Halley's comet, to which reference was made in the notice of the book in last week's NATURE (p. 304), is brought up to date. We do not quite understand why the earlier edition should have been sent to us for notice when a new edition was to be issued a few weeks later.

THE current quarterly issue of Mr. C. Baker's catalogue of second-hand instruments for sale or hire has reached us. Particulars are given of more than 1500 pieces of scientific apparatus which can be bought or hired at the second-hand department at 244 High Holborn, London. From the same house comes a very complete list of additions since 1909 to the stock of lantern-slides of scientific interest.

MR. EDWARD STANFORD announces for publication on January 16 the third edition, rewritten and enlarged, of "The Building of the British Isles," by Mr. A. J. Jukes-Browne. It is eighteen years since the last edition of this work was issued, and much fresh matter has consequently been embodied in the new book.

IN the paragraph relating to the "Live Stock Journal Almanack" in NATURE of December 29, 1910, the name Lord William Cecil should have been Lord Arthur Cecil.